

IN THE CLAIMS

Please amend the claims in the above-identified patent application as follows:

27. (Currently Amended) A method of routing nets within a particular region of a design layout, each net having a set of pins, the method comprising:

- a) partitioning the design region into a first set of sub-regions, wherein a plurality of inter-sub-region edges exist between the sub-regions, and wherein a plurality of the inter-sub-region edges are diagonal;
- b) for each particular net, identifying a set of routes, wherein each route in the route set identified for a particular net traverses a set of sub-regions containing the particular net's pins, wherein each route includes a set of route edges, and each route edge connects two sub-regions, and wherein routes are defined with respect to the inter-sub-region edges;
- c) formulating a linear-programming ("LP") problem based on the identified routes, wherein formulating an LP problem includes using the identified routes to specify an objective function to optimize; and
- d) solving the LP problem to identify one route for each net.

Cancel claim 28.

29. (Currently Amended) The method of claim 27, wherein the objective function includes a component for overall length of the routes for the nets, and solving the LP problem includes searching for a solution to the objective function that reduces the overall-length component.

30. (Currently Amended) The method of claim 27, wherein the objective function includes a component for the expected number of vias for the routes for the nets, and solving the LP problem includes searching for a solution to the objective function that minimizes the via-number component.

Cancel claims 31-35.

36. (Currently Amended) The method of claim 27, wherein the objective function includes a congestion-component that quantifies the congestion of the inter-sub-region edges, and solving the LP problem includes:

measuring the congestion of the inter-sub-region edges for each solution considered by the objective function;

identifying a solution that reduces the congestion of the inter-sub-region edges.

37. (Currently Amended) The method of claim 27, wherein formulating an LP problem includes specifying at least one congestion constraint regarding the congestion of the inter-sub-region edges between the sub-regions.

38. (Currently Amended) The method of claim 27, wherein some of the inter-sub-region edges share common regions with other inter-sub-region edges, wherein formulating an LP problem includes specifying that the capacity of the common regions be properly shared among the inter-sub-region edges.

Cancel Claim 39.

40. (Currently Amended) The method of claim 38, wherein specifying at least one constraint includes requiring that only one route be selected for each net.

Cancel Claim 42.

43. (Currently Amended) A computer readable medium comprising a computer program having executable code, the computer program for routing a net within a particular region of a design layout, the net having a plurality of pins, the computer program comprising:

a) a first set of instructions for partitioning the design region into a first set of sub-regions, wherein a plurality of paths exist between the sub-regions, and wherein a plurality of the paths are diagonal paths, and wherein some of the paths share common regions with other paths;

b) a second set of instructions for identifying, for each particular net, a set of routes, wherein each route in the route set identified for a particular net traverses a set of sub-regions containing the particular net's pins, wherein each route includes a set of route edges, and each route edge connects two sub-regions, and wherein the routes are defined with respect to the paths between sub-regions;

c) a third set of instructions formulating a linear-programming ("LP") problem based on the identified routes, wherein the third set of instructions includes a fifth set of instructions for using the identified routes to specify an objective function to optimize, and wherein the third set of instructions further includes a sixth set of

instructions for specifying that the capacity of common regions be properly shared among paths; and

d) a fourth set of instructions solving the LP problem to identify one route for each net.

Cancel claims 44-45.

46. (Currently Amended) The computer readable medium of claim 43, wherein

the objective function includes a congestion-component that quantifies the congestion of the paths, and

the fourth set of functions includes:

a seventh set of instructions for measuring the congestion of the paths for each solution considered by the objective function;

an eighth set of instructions for identifying a solution that reduces the congestion of the paths.

47. (Currently Amended) The computer readable medium of claim 43, wherein the third set of instructions further includes a seventh set of instructions for specifying a congestion constraint regarding the congestion of the paths between the sub-regions.

Cancel claims 48-52.

53. (Newly Added) A method of routing nets within a particular region of a design layout, each net having a set of pins, the method comprising:

- a) partitioning the design region into a first set of sub-regions, wherein a plurality of paths exist between the sub-regions, and wherein a plurality of the paths are diagonal paths;
- b) for each particular net, identifying a set of routes, wherein each route in the route set identified for a particular net traverses a set of sub-regions containing the particular net's pins, wherein each route includes a set of route edges, and each route edge connects two sub-regions, and wherein the routes are defined with respect to the paths between the sub-regions;
- c) formulating a linear-programming ("LP") problem based on the identified routes, wherein formulating an LP problem includes using the identified routes to specify an objective function to optimize; and
- d) solving the LP problem to identify one route for each net.

54. (Newly Added) The method of claim 53, wherein the objective function includes a congestion-component that quantifies the congestion of the paths, and

solving the LP problem includes:
measuring the congestion of the paths for each solution considered by the objective function;
identifying a solution that reduces the congestion of the paths.

55. (Newly Added) The method of claim 53, wherein formulating an LP problem includes specifying a congestion constraint regarding the congestion of the paths between the sub-regions.

56. (Newly Added) The method of claim 53, wherein some of the paths share common regions with other paths, wherein formulating an LP problem includes specifying that the capacity of common regions be properly shared among the paths.

57. (Newly Added) The method of claim 56, wherein specifying at least one constraint includes requiring that only one route be selected for each net.

58. (Newly Added) The method of claim 57, wherein the formulated LP problem is an integer-linear-programming (“ILP”) problem, and the solving of the ILP problem returns integer solutions that specify one route for each net.

59. (Newly Added) A computer readable medium comprising a computer program having executable code, the computer program for routing a net within a particular region of a design layout, the net having a plurality of pins, the computer program comprising:

- a) a first set of instructions for partitioning the design region into a first set of sub-regions, wherein a plurality of inter-sub-region edges exist between the sub-regions, and wherein a plurality of the inter-sub-region edges are diagonal;
- b) a second set of instructions for identifying, for each particular net, a set of routes, wherein each route in the route set identified for a particular net traverses a set of sub-regions containing the particular net’s pins, wherein each route includes a set

of route edges, and each route edge connects two sub-regions, and wherein the routes are defined with respect to the inter-sub-region edges;

- c) a third set of instructions formulating a linear-programming (“LP”) problem based on the identified routes, wherein the third set of instructions includes a fifth set of instructions for using the identified routes to specify an objective function to optimize; and
- d) a fourth set of instructions solving the LP problem to identify one route for each net.

60. (Newly Added) The computer readable medium of claim 59, wherein the objective function includes a congestion-component that quantifies the congestion of the inter-sub-region edges, and

the fourth set of instructions includes

- a sixth set of instruction for measuring the congestion of the inter-sub-region edges for each solution considered by the objective function;
- a seventh set of instructions for identifying a solution that reduces the congestion of the inter-sub-region edges.

61. (Newly Added) The computer readable medium of claim 59, wherein the third set of instructions includes a sixth set of instructions for specifying a congestion constraint regarding the congestion of the inter-sub-region edges between the sub-regions.

62. (Newly Added) The computer readable medium of claim 59, wherein some of the inter-sub-region edges share common regions with other inter-sub-region edges, wherein the third set of instructions further includes a sixth set of instructions for

specifying that the capacity of the common regions be properly shared among the inter-sub-region edges.

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